Attachments to the VA0062880 Fact Sheet

Attachment 1	Flow Frequency Determination
Attachment 2	Facility Schematic
Attachment 3	Topographic Map
Attachment 4	Site Inspection
Attachment 5	Water Quality Criteria and Wasteload Allocation Determinations
Attachment 6	Limit Evaluations
Attachment 7	Dissolved Oxygen Model
Attachment 8	Public Notice
Attachment 9	Consent Special Order
Attachment 10	EPA Checklist

April 12, 2011
MEMORANDUM

TO: VPDES Reissuance File VA0062880

FROM: Alison Thompson

SUBJECT: Flow Frequency Determination of VPDES Permit No. VA0062880
Sperryville STP

COPIES:

This flow frequency determination is for the VPDES permit reissuance for the Sperryville STP. The Flow Frequency determination was last done in 2006. Staff reviewed the 2006 memorandum. There are no updates to the flows for the reference gauging station, so no changes are necessary to the calculated flow values for the Thornton River. However, the high flow months did change from January-May to December-May.

During the 2006 reissuance, it is was staff's best professional judgment that the flows in the Thornton River should be approximated using the gage station on the Rush River at Washington, Virginia (#01662500) for the following reasons: the drainage areas are comparable, the topography of the Rush River station is similar to that of the Thornton River topography at Sperryville, and both rivers are located in Rappahannock County. The flow frequencies at the outfall location shall be determined using values at the Rush River gauging station at Washington, Virginia, and adjusting them by proportional drainage areas.

Rush River at Washington, VA (#01662500)
(Gauging station data December – May 1953 – 1977)

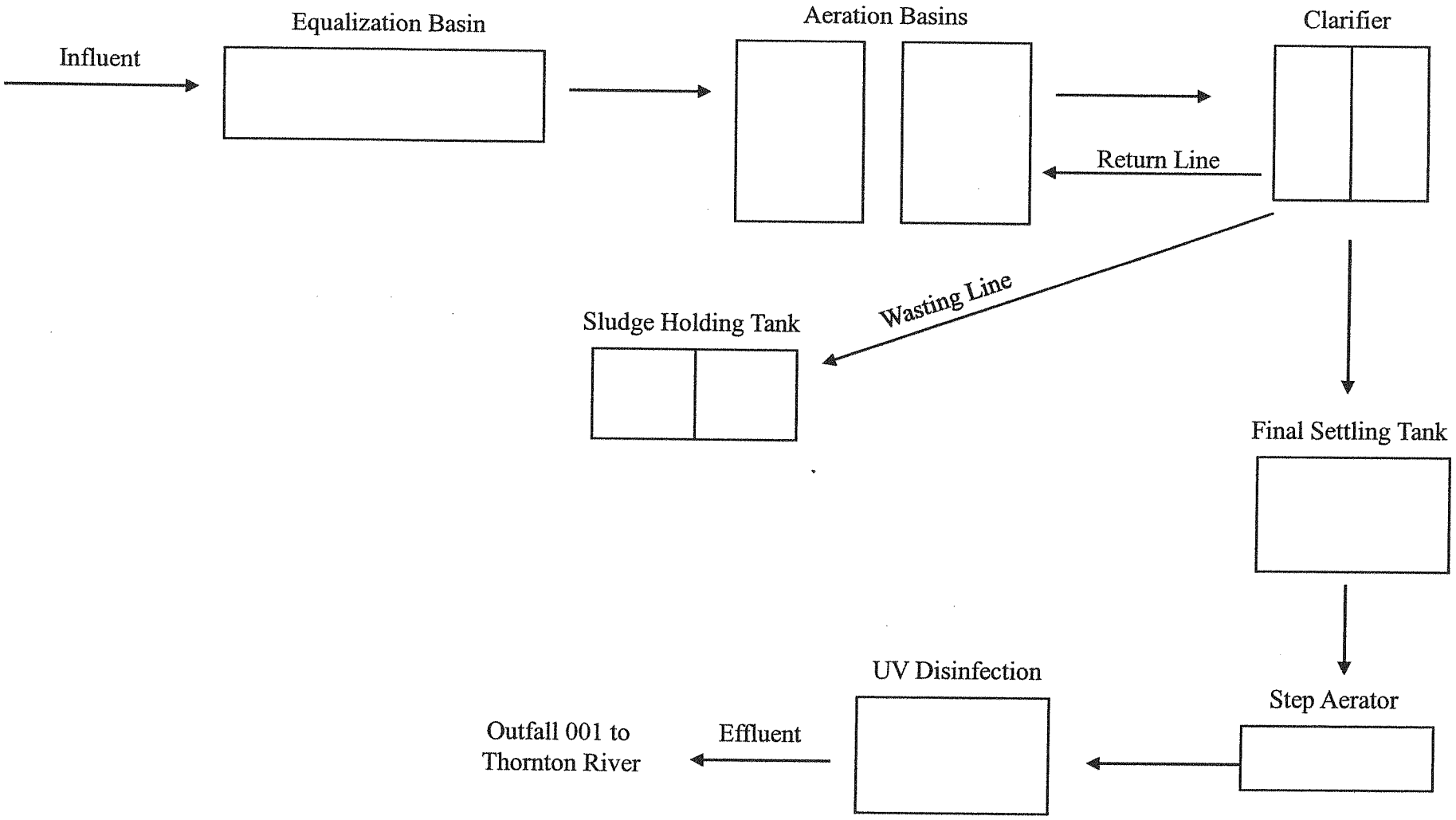
Drainage area	=	14.7 sq. mi.
1Q10	=	0.0 cfs
7Q10	=	0.0 cfs
30Q5	=	0.21 cfs
30Q10	=	0.09 cfs
High flow 30Q10	=	2.7 cfs
High flow 1Q10	=	1.2 cfs
High flow 7Q10	=	1.5 cfs
HM	=	undefined

Thornton River at the Sperryville STP discharge point

Drainage area	=	11.13 sq. mi.	
1Q10	=	0.0 cfs	0.0 MGD
7Q10	=	0.0 cfs	0.0 MGD
30Q5	=	0.16 cfs	0.10 MGD
30Q10	=	0.07 cfs	0.04 MGD
High flow 30Q10	=	2.04 cfs	1.32 MGD
High flow 1Q10	=	0.91 cfs	0.59 MGD
High flow 7Q10	=	1.14 cfs	0.73 MGD
HM	=	undefined	

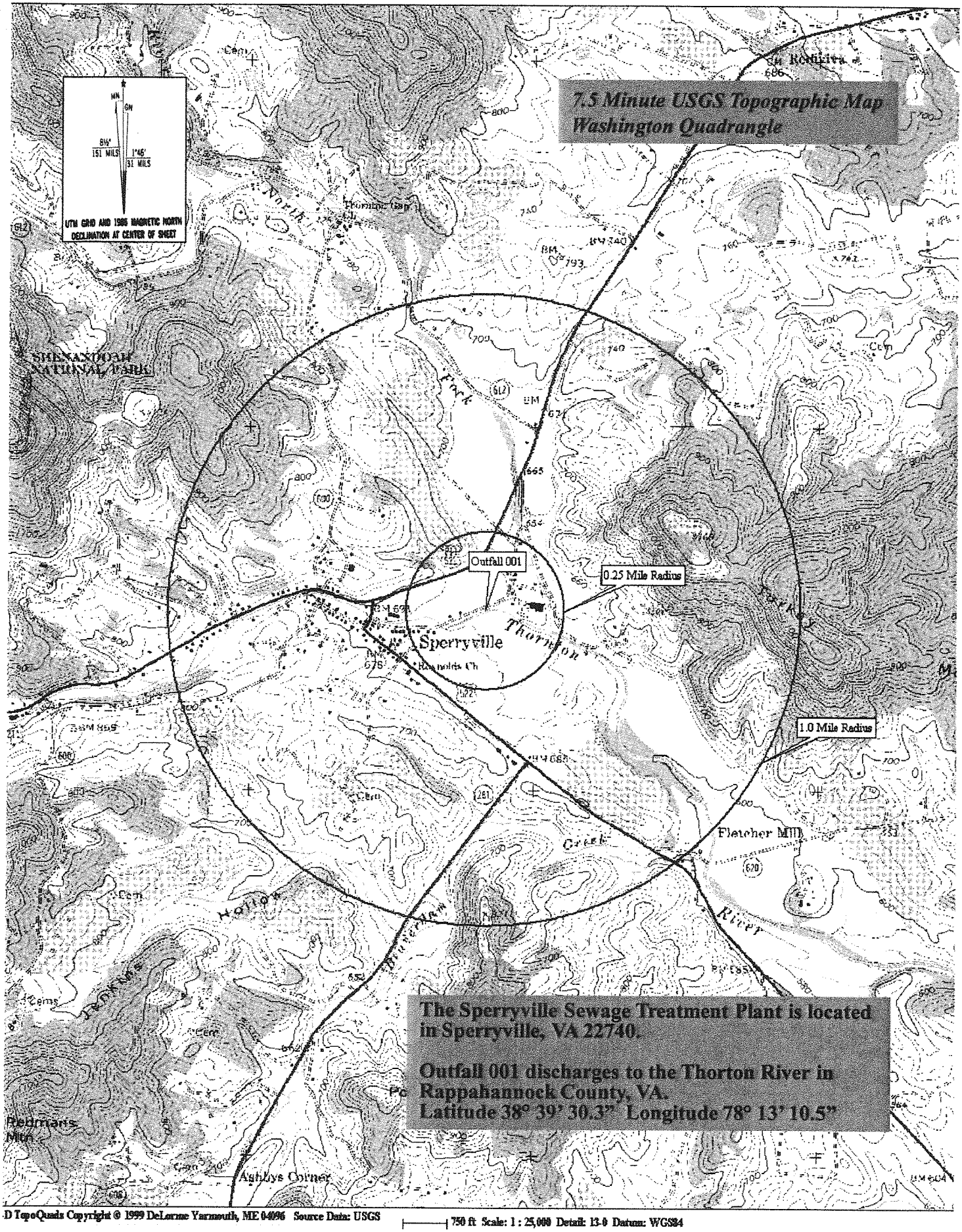
The high flow months are December - May

Flow Diagram of Sperryville STP
VA0062880



Attachment 2

ATTACHMENT TWO



Attachment 3

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Preston Bryant
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

December 17, 2009

Mr. Daniel Keyser
Director
Rappahannock County Water and Sewer Authority
PO Box 253
Sperryville, VA 22740

Re: Sperryville Sewage Treatment Plant Inspection, Permit VA0062880

Dear Mr. Keyser:

Enclosed are copies of the technical and laboratory inspection reports generated from observations made on December 2, 2009 while conducting a Facility Technical Inspection at the Sperryville - Sewage Treatment Plant (STP). The compliance staff would like to thank the ESS and RCWSA staff for their time and assistance during the inspection.

Summaries for both the technical and laboratory inspections are enclosed. Since no significant problems were discovered during the visit, no response is required for this report. If you choose to respond, your response may be sent either via the US Postal Service or electronically, via E-mail. DEQ recommends sending electronic responses as an Acrobat PDF or in a Word-compatible, write-protected format. Additional inspections may be conducted to confirm the facility is in compliance with permit requirements.

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office at (703) 583-3833 or by E-mail at terry.nelson@deq.virginia.gov.

Sincerely,

Terry Nelson

Terry Nelson
Environmental Specialist II

cc: Permit/DMR File
Electronic Copy: Compliance Manager, Compliance Auditor
Electronic Copy: Steve Stell – OWCP

DEQ
WASTEWATER FACILITY INSPECTION REPORT
PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0062880	**September 1, 2006**	**June 2, 2009**	**August 31, 2011**

Facility Name	Address	Telephone Number
Sperryville Sewage Treatment Plant	**3751 Sperryville Pike Sperryville, VA 22740**	**540-987-3185**
Owner Name	Address	Telephone Number
Rappahannock County Water & Sewer	**P.O. Box 253 Sperryville, VA 22740**	**540-987-8471**
Responsible Official	Title	Telephone Number
Mr. Daniel Keyser	**Director**	**540-987-8471**
Responsible Operator	Operator Cert. Class/number	Telephone Number
Mr. Don Hearl	**Class I/1909-000426**	**540-825-6660**

TYPE OF FACILITY:

DOMESTIC				**INDUSTRIAL**			
Federal		Major		Major		Primary	
Non-federal	**X**	Minor	**X**	Minor		Secondary	

INFLUENT CHARACTERISTICS:	DESIGN:
Flow	**0.055 MGD**
Population Served	**Approx 250**
Connections Served	**180**
BOD_5	**Unknown**
TSS	**Unknown**

EFFLUENT LIMITS: Units in mg/L unless otherwise specified.

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
Flow (MGD)		**NL**	**NL**	**pH (S.U.)**	**6.0**		**9.0**
BOD_5		**30**	**45**	**NH3(Jun – Dec)**		**5.1**	**7.5**
TSS		**30**	**45**	**TKN**		**NL**	
DO	**6.0**			**Nitrate + Nitrite**		**NL**	
Hardness		**NL**	**NL**	**Total N**		**NL**	
E. Coli (N/CML)		**126**		**Total P**		**NL**	
Total Copper(ug/L)		**0.18**	**0.18**	**Ortho Phosphate**		**NL**	

Receiving Stream	**South Fork of Thornton River**
Basin	**Rappahannock River**
Discharge Point (LAT)	**38° 39' 29" N**
Discharge Point (LONG)	**78° 13' 09" W**

Virginia Department of Environmental Quality
Northern Regional Office

FOCUSED CEI TECH/LAB INSPECTION REPORT

FACILITY NAME: Sperryville STP			**INSPECTION DATE:**	December 2, 2009
			INSPECTOR	Terry Nelson
PERMIT No.: VA00628801			**REPORT DATE:**	December 17, 2009
TYPE OF FACILITY:	☑ Municipal	☐ Major	**TIME OF INSPECTION:**	Arrival 0930 / Departure 1100
	☐ Industrial	☑ Minor		
	☐ Federal	☐ Small Minor	**TOTAL TIME SPENT (including prep & travel)**	8 hours
	☐ HP	☐ LP		
PHOTOGRAPHS:	☑ Yes	☐ No	**UNANNOUNCED INSPECTION?**	☐ Yes ☑ No
REVIEWED BY / Date:	Earl L. Hearl	12/10/09		
PRESENT DURING INSPECTION:	Don Hearl; ESS Daniel Keyser, Troy Jenkins Sr.; RCWSA			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments: **Switch to UV system was approved**	☑ Yes ☐ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments: **Need phone number revisions**	☐ Yes ☑ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? Comments:	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments:	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments:	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments:	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments:	☐ Yes ☑ No
8. Have there been any bypassing or overflows since the last inspection? Comments:	☐ Yes ☑ No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments: **UV system has back-up power, aeration blowers would require a generator rental and hardwiring into control panel**	☐ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments:	☑ Yes ☐ No

Permit #	VA0062880

TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? Comments:	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No

14. Which of the following records does the plant maintain?

☑ Operational logs ☑ Mechanical equipment maintenance

☑ Instrument maintenance & calibration ☐ Industrial Waste Contribution (Municipal

Comments:

15. What does the operational log contain?

☑ Visual observations ☑ Flow Measurement ☑ Laboratory results ☑ Process adjustments

☐ Control calculations ☐ Other (specify)

Comments:

16. What do the mechanical equipment records contain?

☑ As built plans and specs ☑ Manufacturers instructions ☑ Lubrication schedules

☑ Spare parts inventory ☑ Equipment/parts suppliers

☐ Other (specify)

Comments:

17. What do the industrial waste contribution records contain (Municipal only)?

☐ Waste characteristics ☐ Impact on plant ☐ Locations and discharge types

☐ Other (specify)

Comments:

18. Which of the following records are kept at the plant and available to personnel?

☑ Equipment maintenance records ☑ Operational log ☐ Industrial contributor records

☑ Instrumentation records ☑ Sampling and testing

Comments:

19. List records not normally available to plant personnel and their location:

Comments: **None**

20. Are the records maintained for the required time period (three or five years)? Comments:	☑ Yes ☐ No

Permit #	VA0062880

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping			
Flow Measurement (Influent)			
Screening/Comminution			
Grit Removal			
Oil/Water Separator			
Flow Equalization	X		
Ponds/Lagoons			
Imhoff Tank			
Primary Sedimentation			
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration	X		
Biological Nutrient Removal			
Sequencing Batch Reactor			
Secondary Sedimentation	X		
Flocculation			
Tertiary Sedimentation			
Filtration			
Micro-Screening			
Activated Carbon Adsorption			
Chlorination			
Dechlorination			
Ozonation			
Ultraviolet Disinfection	X		Trojan 3000 new since 2005 visit
Post Aeration	X		
Flow Measurement (Effluent)	X		
Land Application (Effluent)			
Plant Outfall	X		
Sludge Pumping			
Flotation Thickening (DAF)			
Gravity Thickening			
Aerobic Digestion			
Anaerobic Digestion			
Lime Stabilization			
Centrifugation			
Sludge Press			
Vacuum Filtration			
Drying Beds			
Thermal Treatment			
Incineration			
Composting			
Land Application (Sludge)			

* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

VPDES NO. **VA0062880**

UNIT PROCESS: Ultraviolet (UV) Disinfection

1. Number of UV lamps/assemblies: **4 lamps** In operation: **2 lamps**
2. Type of UV system and design dosage: **Trojan UV3000**
3. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA
4. Method of UV intensity monitoring: **Intensity probe**
5. Adequate ventilation of ballast control boxes: [**X**] Yes [ ] No* [ ] NA
6. Indication of on/off status of all lamps provided: [**X**] Yes [ ] No*
7. Lamp assemblies easily removed for maintenance: [**X**] Yes [ ] No*
8. Records of lamp operating hours and replacement dates provided: [**X**] Yes [ ] No*
9. Routine cleaning system provided: [ ] Yes [**X**] No*
   Operate properly: [ ] Yes [ ] No*
   Frequency of routine cleaning: **Manually cleaned each week**
10. Lamp energy control system operate properly: [**X**] Yes [ ] No*
11. Date of last system overhaul: **None**
    a. UV unit completely drained [ ] Yes [ ] No*
    b. all surfaces cleaned [ ] Yes [ ] No*
    c. UV transmissibility checked [ ] Yes [ ] No*
    d. output of selected lamps checked [ ] Yes [ ] No*
    e. output of tested lamps
    f. total operating hours, oldest lamp/assembly **10520 main system, 3829 spare system**
    g. number of spare lamps and ballasts available: lamps: **2** ballasts: **0**
12. UV protective eyeglasses provided: [**X**] Yes [ ] No*
13. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:
There are 2 banks of bulbs. Each bank has 2 bulbs.
Systems are in parallel and only one bank is active at any time.
The intensity probe was reading 5.2 mW/cm^2. The operator said the trigger level for the low intensity alarm is 1.3 mW/cm^2.

Permit #	VA0062880

Facility Description:

The Sperryville Treatment Plant receives effluent from individual septic tanks within the collection system area. The processes of screening and grit removal are performed by the individual septic tanks. These tanks are checked on a regular basis and the septage pumped out as needed. A septage hauler transports the materials to the Waste Water Treatment Plant(s) where he has a contract.

The individual homes have pumps that send the effluent from the septic tanks to the Sperryville plant using a pressurized system. No sewage pumps are required at the Sperryville plant except for process pumping like Return Activated Sludge.

The Rappahannock County Water and Sewer Authority (RCWSA) is the owner of the collection system. Collection system maintenance funds are part of the STP budget or are requested when needed.

The Sperryville STP is a secondary treatment package plant with an adjacent equalization basin. The plant has soda ash and lime feed at the headworks, screening, two aeration basins, two clarifiers, and UV disinfection. The effluent is aerated prior to discharge through Outfall 001 to the Thornton River.

Since the October 2005 inspection, the facility has been referred to Enforcement for exceeding the total copper effluent limit. Chemical treatment is utilized to reduce the copper, but the treatment plant was not designed for copper removal and chemical treatment is not sufficient to meet the copper limits. One Total Residual Chlorine violation was reported in November 2007 when chlorine tablets were bridged in the tablet feeder. Chlorine disinfection was discontinued in April 2008 when a Trojan UV system was installed. Ammonia effluent limits were exceeded in November 2008 when falling leaves clogged the clarifier lines. The plant is installing screens to prevent future clogs.

Permit #	VA0062880

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- The weather was cloudy and cool, low 40's.
- DEQ staff discussed plant staffing with Mr. Hearl and Mr. Keyser.
- Troy Jenkins Sr. retired in September and is now working part time.
- An employee from the landfill had started working at the plant. He recently decided against continuing at the treatment plant.
- According to Mr. Keyser, the landfill employee had attended some wastewater training but had not completed any Initial Demonstration of Capability for pH or DO.
- Mr. Hearl said that the Rappahannock County Water and Sewer Authority would be meeting by December 5, 2009 to resolve the issue of who would operate the plant in the future.
- They will either hire a new operator or seek an outside contract firm like ESS.
- DEQ staff reviewed operator logs and laboratory records for on-site analysis of pH and DO.
- A laboratory report for DO and pH is attached to this report.
- DEQ staff discussed metals violations and how they would be addressed.
- According to Mr. Keyser, the plant is about 24 years old and it might require replacement to meet the Chesapeake Bay discharge requirements for Nitrogen and Phosphorus.
- Any upgrade would include appropriate treatment for metals.
- Since the 2005 inspection, the chlorine/bisulfite tablet feeders were replaced with UV disinfection.
- An emergency generator was purchased for the UV system, but does not have enough capacity for the aeration blowers.
- Since the facility is currently rated for Class II reliability, emergency power would be required after 24 hour power disruption. Mr. Jenkins and Mr. Keyser could not recall having lost power for that long.
- Mr. Hearl and Mr. Nelson walked the plant.
- No problems were observed with the flow distribution or coloration of the various processes.
- A large mesh screen has been placed over the open tanks to catch falling leaves and other major debris.
- White discoloration was observed on some netting and the walkway between the aeration basins. The facility adjusts alkalinity and pH by hand feeding chemicals to the aeration basins.
- Peeling paint and corrosion was observed in several locations. This was also observed during the 2005 inspection.
- The UV system appeared to be working properly. The flow can be routed to either bank of UV bulbs by opening and closing valves.
- The river and outfall vicinity were observed and no effluent plume was visible.
- The effluent pH and DO was measured in-situ at the end of the UV system. DO was measured at 1025 hours and pH was measured at 1027 hours.
- Grab samples of the effluent were collected at 1040 hours.

Permit #	VA0062880

EFFLUENT FIELD DATA:

Flow	0.025 MGD	**Dissolved Oxygen**	10.4 mg/L	**TRC (Contact Tank)**	NA mg/L
pH	7.5 S.U.	**Temperature**	10.5 °C	**TRC (Final Effluent)**	NA mg/L
Was a Sampling Inspection conducted?	☑ Yes (see Sampling Inspection Report)		☐ No		

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☐ Shore based ☑ Submerged Diffuser? ☐ Yes ☑ No
2. Are the outfall and supporting structures in good condition? ☑ Yes ☐ No
3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease
   ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen
4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☑ No
5. Receiving stream: ☑ No observed problems ☐ Indication of problems (explain below)
   Comments:

REQUIRED CORRECTIVE ACTIONS:

1. Permit VA0062880, Part I, Section D, Number 3 states, " Any changes in the practices and procedures followed by the permittee shall be documented and submitted for staff approval within 90 days of the effective date of the changes. Upon approval of the submitted manual changes, the revised manual becomes an enforceable part of the permit. Noncompliance with the O&M Manual shall be deemed a violation of the permit." Appendix 6 of the approved July 2008 O&M manual includes a maintenance schedule for the Hydro Aerobics package plant. Included in the maintenance schedule is yearly removal of rust and repainting the rusted areas. RCWSA shall have the rusted and corroded parts of the plant cleaned and repainted.

NOTES and COMMENTS:

- DEQ staff is requesting that the contact phone numbers on page 4 of the O&M manual be updated. *(Updates were supplied in electronic format prior to completing the report. Item is resolved.)*

Permit #	VA0062880

LABORATORY INSPECTION

PRESENT DURING INSPECTION:	Don Hearl, Daniel Keyser, Troy Jenkins Sr

1.	Do lab records include sampling date/time, analysis date/time, sample location, test method, test results, analyst's initials, instrument calibration and maintenance, and Certificate of Analysis? ☑ Sampling Date/Time ☑ Analysis Date/Time ☑ Sample Location ☑ Test Method ☑ Test Results ☑ Analyst's Initials ☑ Instrument Calibration & Maintenance ☑ Chain of Custody ☑ Certificate of Analysis	
2.	Are Discharge Monitoring Reports complete and correct? Month(s) reviewed: October 2009	☑ Yes ☐ No
3.	Are sample location(s) according to permit requirements (after all treatment unless otherwise specified)?	☑ Yes ☐ No
4.	Are sample collection, preservation, and holding times appropriate; and is sampling equipment adequate?	☑ Yes ☐ No
5.	Are grab and composite samples representative of the flow and the nature of the monitored activity?	☑ Yes ☐ No
6.	If analysis is performed at another location, are shipping procedures adequate? List parameters and name & address of contract lab(s): • ESS, Inc in Culpeper, VA (BOD, TSS, Nitrogen, Phosphorus, Metals, E. Coli)	☑ Yes ☐ No
7.	Is Laboratory equipment in proper operating range?	☑ Yes ☐ No
8.	Are annual thermometer calibration(s) adequate?	☑ Yes ☐ No
9.	Is the laboratory grade water supply adequate? **Not Applicable**	☐ Yes ☐ No
10.	Are analytical balance(s) adequate? **Not Applicable**	☐ Yes ☐ No
11.	Parameters evaluated during this inspection (attach checklists): **pH and DO**	

ANALYST:	**Daniel Keyser**	VPDES NO	**VA0062880**

Parameter: Hydrogen Ion (pH)
Method: Electrometric
01/08

Meter: Orion 410A

METHOD OF ANALYSIS

X	18th Edition of Standard Methods-4500-H-B
	21st or On-Line Edition of Standard Methods-4500-H-B (00)

	pH is a method defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing the analysis? **NOTE:** Analyze 4 samples of known pH. May use external source of buffer (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be ± 0.1 SU of the known concentration of the sample. [SM 1020 B.1]	X	
2)	Is the electrode in good condition (no chloride precipitate, etc.)? [2.b/c and 5.b]	X	
3)	Is electrode storage solution in accordance with manufacturer's instructions? [Mfr.]	X	
4)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [4.a] NOTE: Follow manufacturer's instructions.	X	
5)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Agreement should by within ± 0.1 SU. [4.a]	X	
6)	Do the buffer solutions appear to be free of contamination or growths? [3.1]	X	
7)	Are buffer solutions within their listed shelf life or have they been prepared within the last 4 weeks? [3.a]	X	
8)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	NA	
9)	For meters with ATC that also have temperature display, was the thermometer calibrated annually? [SM2550 B.1]	X	
10)	Is the temperature of buffer solutions and samples recorded when determining pH? [4.a]	X	
11)	Is sample analyzed within 15 minutes of collection? [40 CFR 136.6]	X	
12)	Was the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinse solution)? [4.a]	X	
13)	Is the sample stirred gently at a constant speed during measurement? [4.b]	X	
14)	Does the meter hold a steady reading after reaching equilibrium? [4.b]	X	
15)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition [1020 B.6] or daily for 20th or 21st Edition [Part 1020] Note: Not required for *in situ* samples.	NA	
16)	Is pH of duplicate samples within 0.1 SU of the original sample? [Part 1020]	NA	
17)	Is there a written procedure for which result will be reported on DMR (Sample or Duplicate) and is this procedure followed? [DEQ]	NA	

COMMENTS:	**15-17) As of July 2008, field parameters do not require duplicate analysis.** • **Thermistor was checked on 07/28/09 and had +0.1° C correction factor. Check was done at 0.2 ° C, 10.2 ° C, and 22.0 ° C.**
PROBLEMS:	• **No problems observed.**

ANALYST:	**Daniel Keyser**	VPDES NO.	**VA0062880**

Parameter: Dissolved Oxygen
Method: Electrode
Facility Elevation – 600 ft
01/08

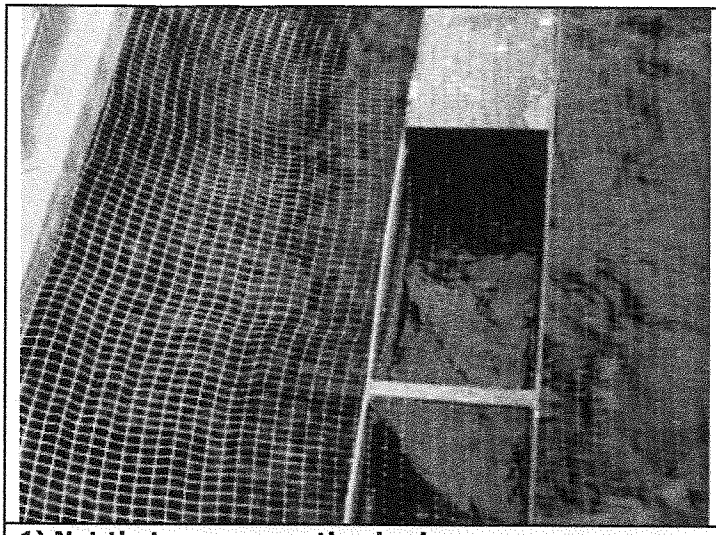
Meter: YSI Model 54A

METHOD OF ANALYSIS:

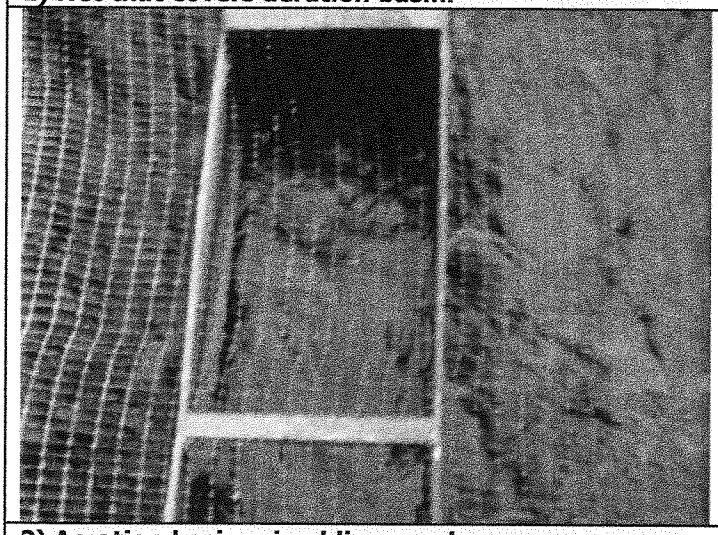
X	18th Edition of Standard Methods-4500-O G
	21st or Online Editions of Standard Methods-4500-O G (01)

	DO is a method defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [B.3]	**In-situ**	
2)	Are meter and electrode operable and providing consistent readings? [3]	**X**	
3)	Is membrane in good condition without trapped air bubbles? [3.b]	**X**	
4)	Is correct filling solution used in electrode? [Mfr.]	**X**	
5)	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	**X**	
6)	Is meter calibrated before use or at least daily? [Mfr.]	**X**	
7)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	**X**	
8)	Is sample stirred during analysis? [Mfr.]	**In-situ**	
9)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	**X**	
10)	Is meter stabilized before reading D.O.? [Mfr.]	**X**	
11)	Is electrode stored according to manufacturer's instructions? [Mfr.]	**X**	
12)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition [1020 B.6] or daily if citing 20th or 21st Edition [Part 1020] Note: Not required for *in situ* samples.	**NA**	
13)	If a duplicate sample is analyzed, is the reported value for that sampling event, the average concentration of the sample and the duplicate? [DEQ]	**NA**	
14)	If a duplicate sample is analyzed, is the relative percent difference (RPD) < 20? [18th ed. Table 1020 I; 21st ed. DEQ]	**NA**	

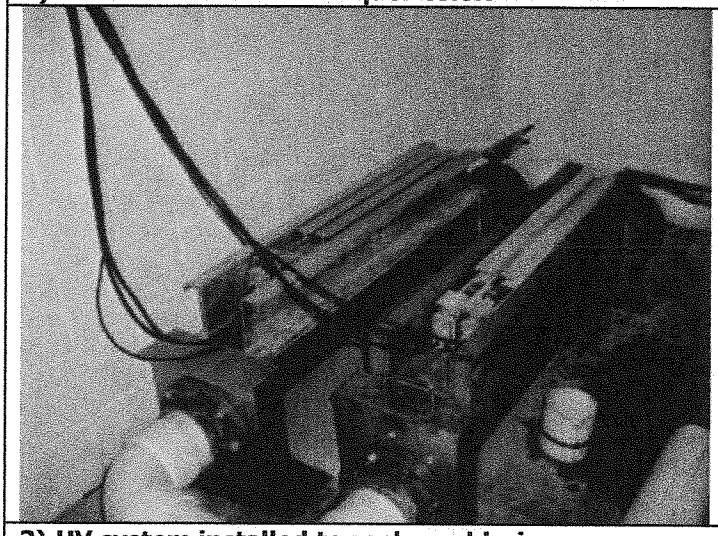
COMMENTS:	**12-14) As of July 2008, field parameters do not require duplicate analysis.** • **Thermistor was checked on 08/07/09 and had no correction factor. Check was done at 1.6 ° C, 10.6 ° C, and 24.6 ° C.**
PROBLEMS:	• **No problems observed.**



1) Net that covers aeration basin.



2) Aeration basin mixed liquor color.



3) UV system installed to replace chlorine.

Sperryville STP	Permit VA0062880
Photos by Terry Nelson	December 2, 2009
Layout by Terry Nelson	Page 1 of 1

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Sperryville STP Permit No.: VA0062880

Receiving Stream: Thornton River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	50	mg/L
90% Temperature (Annual) =	20	deg C
90% Temperature (Wet season) =	15	deg C
90% Maximum pH =	7.5	SU
10% Maximum pH =		SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0	MGD
7Q10 (Annual) =	0	MGD
30Q10 (Annual) =	0.04	MGD
1Q10 (Wet season) =	0.59	MGD
30Q10 (Wet season)	1.32	MGD
30Q5 =	0.1	MGD
Harmonic Mean =	0	MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	165	mg/L
90% Temp (Annual) =	24.3	deg C
90% Temp (Wet season) =	17.6	deg C
90% Maximum pH =	7.7	SU
10% Maximum pH =		SU
Discharge Flow =	0.055	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	2.6E+01	--	--	--	--	--	--	--	--	--	--	na	2.6E+01
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	1.44E+01	2.37E+00	na	--	1.4E+01	4.1E+00	na	--	--	--	--	--	--	--	--	--	1.4E+01	4.1E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.95E+01	4.18E+00	na	--	2.3E+02	1.0E+02	na	--	--	--	--	--	--	--	--	--	2.3E+02	1.0E+02	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	--	--	na	1.8E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	--	--	na	5.1E+02
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	--	--	na	2.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Bis2-Chloroethyl Ether[C]	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	--	--	na	5.3E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.8E+05	--	--	--	--	--	--	--	--	--	--	na	1.8E+05
Bis 2-Ethylhexyl Phthalate[C]	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03
Cadmium	0	6.9E+00	1.7E+00	na	--	6.9E+00	1.7E+00	na	--	--	--	--	--	--	--	--	--	6.9E+00	1.7E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	--	--	na	1.6E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.1E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03

Attachment 5

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+0
Chloroform	0	--	--	na	1.1E+04	--	--	na	3.1E+04	--	--	--	--	--	--	--	--	--	--	na	3.1E+0
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+0
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+0
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	8.6E+02	1.1E+02	na	--	8.6E+02	1.1E+02	na	--	--	--	--	--	--	--	--	--	8.6E+02	1.1E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	1.8E-0
Copper	0	2.2E+01	1.4E+01	na	--	2.2E+01	1.4E+01	na	--	--	--	--	--	--	--	--	--	2.2E+01	1.4E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	4.5E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	4.5E+0
DDD [C]	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	3.1E-0
DDE [C]	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	2.2E-0
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.2E-0
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-0
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	3.7E+03	--	--	--	--	--	--	--	--	--	--	na	3.7E+0
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+0
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	5.4E+02	--	--	--	--	--	--	--	--	--	--	na	5.4E+0
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	--	--	na	2.8E-0
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+0
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+0
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+0
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.8E+04	--	--	--	--	--	--	--	--	--	--	na	2.8E+0
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	8.2E+02	--	--	--	--	--	--	--	--	--	--	na	8.2E+0
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+0
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	--	--	na	2.1E+0
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.4E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.4E-0
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+0
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.4E+03	--	--	--	--	--	--	--	--	--	--	na	2.4E+0
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	3.1E+06	--	--	--	--	--	--	--	--	--	--	na	3.1E+0
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+0
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+0
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	7.9E+02	--	--	--	--	--	--	--	--	--	--	na	7.9E+0
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	--	--	na	3.4E+0
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.4E-07	--	--	--	--	--	--	--	--	--	--	na	1.4E-0
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	--	--	na	2.0E+0
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	2.5E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.5E+0
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	2.5E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.5E+0
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.5E+02	--	--	--	--	--	--	--	--	--	--	na	2.5E+0
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	1.7E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	1.7E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	8.5E-01	--	--	--	--	--	--	--	--	--	--	na	8.5E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	--	--	na	5.9E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	--	--	na	3.9E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	7.9E-04
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	3.9E-04
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	--	--	na	2.9E-03
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	--	--	na	4.9E-02
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	--	--	na	1.7E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.8E+00	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	3.1E+03
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	--	--	na	9.6E+03
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.2E+02	2.6E+01	na	--	2.2E+02	2.6E+01	na	--	--	--	--	--	--	--	--	--	2.2E+02	2.6E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	--	--	na	5.9E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.8E+02	3.1E+01	na	4.6E+03	2.8E+02	3.1E+01	na	1.3E+04	--	--	--	--	--	--	--	--	2.8E+02	3.1E+01	na	1.3E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	--	--	na	3.0E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	--	--	na	5.1E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.4E-04	--	--	--	--	--	--	--	--	--	1.4E-02	na	6.4E-04
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	3.0E+01	7.7E-03	5.9E-03	na	3.0E+01	--	--	--	--	--	--	--	--	7.7E-03	5.9E-03	na	3.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	2.4E+06	--	--	--	--	--	--	--	--	--	--	na	2.4E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	1.2E+04	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	1.2E+04
Silver	0	8.2E+00	--	na	--	8.2E+00	--	na	--	--	--	--	--	--	--	--	--	8.2E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	1.3E+00	--	--	--	--	--	--	--	--	--	--	na	1.3E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.8E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	2.8E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	7.2E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	--	--	na	2.0E+02
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
Zinc	0	1.8E+02	1.8E+02	na	2.6E+04	1.8E+02	1.8E+02	na	7.3E+04	--	--	--	--	--	--	--	--	1.8E+02	1.8E+02	na	7.3E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.8E+03
Arsenic	9.0E+01
Barium	na
Cadmium	1.0E+00
Chromium III	6.7E+01
Chromium VI	6.4E+00
Copper	8.2E+00
Iron	na
Lead	1.5E+01
Manganese	na
Mercury	4.6E-01
Nickel	1.9E+01
Selenium	3.0E+00
Silver	3.3E+00
Zinc	7.2E+01

Note: do not use QL's lower than th
minimum QL's provided in agency
guidance

Mixing Zone Predictions for Sperryville STP

Effluent Flow = 0.055 MGD
Stream 7Q10 = 0.73 MGD
Stream 30Q10 = 1.32 MGD
Stream 1Q10 = 0.59 MGD
Stream slope = .001 ft/ft
Stream width = 15 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .4351 ft
Length = 325.35 ft
Velocity = .1862 ft/sec
Residence Time = .0202 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .6146 ft
Length = 240.31 ft
Velocity = .2309 ft/sec
Residence Time = .012 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .3858 ft
Length = 361. ft
Velocity = .1725 ft/sec
Residence Time = .5813 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Virginia DEQ Mixing Zone Analysis Version 2.1

VA0062880 Total Hardness Effluent Data (mg/L CaCO3)

Monitoring Period	Results
Fourth Quarter 2010	155
Third Quarter 2010	103
Second Quarter 2010	131
First Quarter 2010	158
Third Quarter 2009	169
Second Quarter 2009	183
First Quarter 2009	190
Fourth Quarter 2008	186
Third Quarter 2008	183
Second Quarter 2008	114
First Quarter 2008	167
Fourth Quarter 2007	217
Third Quarter 2007	214
Second Quarter 2007	125
First Quarter 2007	148
Fourth Quarter 2006	192
	164.6875

Note: The data retrival did not include a Fourth Quarter 2009 sample value.

VA0062880 Effluent pH Data (S.U.)

Minimum	11-Mar-11	6.60
Values	11-Feb-11	6.90
	11-Jan-11	6.80
	10-Dec-10	6.80
	12-Nov-10	6.90
	12-Oct-10	7.00
	13-Sep-10	7.10
	11-Aug-10	7.40
	12-Jul-10	7.20
	11-Jun-10	7.00
	11-May-10	6.80
	12-Apr-10	6.90
	11-Mar-10	6.80
	12-Feb-10	6.70
	11-Jan-10	7.00
	10-Dec-09	7.00
	9-Nov-09	7.10
	13-Oct-09	6.20
	11-Sep-09	6.56
	11-Aug-09	6.76
	13-Jul-09	7.13
	10-Jun-09	6.94
	11-May-09	6.77
	13-Apr-09	6.70
	11-Mar-09	6.23
	11-Feb-09	6.30
	12-Jan-09	6.58
	11-Dec-08	6.51
	12-Nov-08	6.75
	14-Oct-08	6.85
	11-Sep-08	6.41
	11-Aug-08	6.87
	11-Jul-08	6.60
	11-Jun-08	6.79
	12-May-08	7.05
	11-Apr-08	6.98
	11-Mar-08	6.87
	11-Feb-08	6.67
	14-Jan-08	6.75
	11-Dec-07	6.00
	13-Nov-07	6.26
	10-Oct-07	6.96
	11-Sep-07	6.92
	13-Aug-07	6.60
	10-Jul-07	6.77
	11-Jun-07	6.88
	11-May-07	6.82
	11-Apr-07	6.85
	12-Mar-07	6.76
	12-Feb-07	6.68
	10-Jan-07	7.00
Max Values	11-Mar-11	7.60
	11-Feb-11	7.90

The date is the DMR received date.
Data is from the previous month.

Date	pH values
11-Jan-11	7.90
10-Dec-10	7.70
12-Nov-10	7.70
12-Oct-10	7.80
13-Sep-10	7.90
11-Aug-10	7.90
12-Jul-10	7.90
11-Jun-10	8.00
11-May-10	7.70
12-Apr-10	7.60
11-Mar-10	7.40
12-Feb-10	7.40
11-Jan-10	7.50
10-Dec-09	7.70
9-Nov-09	7.80
13-Oct-09	7.50
11-Sep-09	7.67
11-Aug-09	7.92
13-Jul-09	7.55
10-Jun-09	8.64
11-May-09	8.15
13-Apr-09	7.63
11-Mar-09	7.80
11-Feb-09	7.05
12-Jan-09	7.48
11-Dec-08	7.86
12-Nov-08	7.52
14-Oct-08	7.47
11-Sep-08	7.46
11-Aug-08	7.80
11-Jul-08	8.18
11-Jun-08	8.04
12-May-08	7.82
11-Apr-08	7.65
11-Mar-08	8.45
11-Feb-08	7.99
14-Jan-08	7.66
11-Dec-07	7.54
13-Nov-07	7.54
10-Oct-07	8.00
11-Sep-07	7.84
13-Aug-07	7.70
10-Jul-07	7.90
11-Jun-07	7.65
11-May-07	7.47
11-Apr-07	7.48
12-Mar-07	7.59
12-Feb-07	7.91
90th percentile	**7.9**

DEPARTMENT OF ENVIRONMENTAL QUALITY

SUBJECT: **Review of Sperryville STP Water Effect Ratio Study**

By: Alex M. Barron

Date: May 2012

Summary Finding:
The Town of Sperryville Virginia conducted a water effect ratio (WER) study following EPA's guidelines for a streamlined copper WER study under suitable conditions and resulted in establishing a WER of 7.078 to be applied to total copper concentrations as these pertain to this discharge. The WER will be used to adjust the Virginia acute and chronic criteria for copper and calculate the resulting waste load allocations (WLA) for this permit and will be used to make permit decisions for the need for copper discharge limits for the Sperryville STP.

Description of study and review:
The Town of Sperryville, a small unincorporated town in Rappahannock County Virginia conducted a water effect ratio (WER) study for copper in order to establish a WER that can be applied to the Virginian copper criteria equations to calculate copper criteria that would apply to the discharge from their sewage treatment plant (STP).

Virginia's water quality criteria for copper in freshwater consists of formulas to adjust the acute or chronic criteria for hardness using formulas developed and recommended by the U.S Environmental Protection Agency (EPA). The Virginia criteria formulas include a water effect ratio (WER) which is set at a default value of 1.0 unless a WER study is performed for a specific receiving stream and discharge to establish a WER for that receiving stream. The Town of Sperryville conducted the WER study in order to establish a WER applicable to their STP's receiving stream and to their discharge permit.

The Virginia freshwater criteria formulas for copper are shown below.
Freshwater acute criterion (µg /l) = WER x $[_e\{0.9422[\ln(\text{hardness})]-1.700\}]$ x (CFa)

Freshwater chronic criterion (µg/l) = WER x $[_e\{0.8545[\ln(\text{hardness})]-1.702\}]$ x (CFc)

WER = Water Effect Ratio =1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310.
e = natural antilogarithm
ln=natural logarithm
CFa = 0.960
CFc = 0.960

Sperryville WER Study:
The Town of Sperryville conducted a water effect ratio (WER) study for copper in order to establish a WER that can be applied to the Virginian copper criteria equations to calculate copper criteria that would apply to the receiving stream and to their discharge permit. This study followed the EPA guidance for a Streamlined Water-Effect Ratio Procedure for Discharges of Copper EPA-822-R-01-05 (hereafter referred to as the streamlined WER guidance). This guidance document is available at: http://epa.gov/waterscience/criteria/copper/2003/index.htm.

This streamlined WER guidance requires two sets of side-by side WER toxicity tests, conducted at different times at least a month apart and using a representative sample of the effluent and stream water mix at permit conditions. Each WER test consists of two side-by side toxicity tests using added copper to establish the LC_{50} value for copper. One of the tests is conducted in clean laboratory water and another test is conducted in simulated stream water consisting of receiving stream water and effluent mixed at the conditions of the permit. The two LC_{50} values for these two toxicity tests are used to calculate a water effect ratio by dividing the LC_{50} value from the test with the simulated stream-water by the LC_{50} value from the lab-water test.

A review of the streamlined water effect ratio (WER) study for the Town of Sperryville STP indicates that the set of toxicity tests conducted on July 7-9, 2010 and August 2-4 2010 were conducted under acceptable conditions and are suitable for establishing a WER for this permitted facility. In all tests, the testing laboratory measured the concentrations of copper in the toxicity tests and calculated LC_{50} values based on total copper measurements. This allowed for the calculation of a WER that is applicable to total copper measurements.

In both sets of tests the LC_{50} values for the lab-water tests were lower than the species mean acute value (SMAV) based on other LC_{50} values reported in the literature for the test species *Ceriodaphnia dubia*, and which forms the dataset used to develop the freshwater copper criteria in the EPA criteria document. This is not unusual since more recent LC_{50} values lab practices in conducting toxicity tests use very clean water that contain very little binding material, resulting in lower LC_{50} values compared to tests in the past (which form the basis for the EPA and Virginia criteria) where lab waters often contained some carbon or other substances that lowered the toxicity of copper, resulting in higher LC_{50} values Under these circumstances (lab water LC_{50} values lower than the SMAV), the Streamlined Water-Effect Ratio Procedure for Discharges of Copper specifies that instead of dividing the site-water LC_{50} value by the lab-water LC_{50} value, the SMAV must be used as the denominator in calculating the WER. This is done to keep the WER comparable to the established criteria values. Following the EPA's streamlined WER guidance (on page 13 and Appendix B page 17), the SMAV reported in the EPA streamlined WER guidance was used to establish the WER for this discharge and receiving stream. Before calculating the WERs, the SMAV values from the toxicity tests and SMAVs from the EPA streamlined WER guidance (Appendix B page 17) were normalized to the same hardness level of the site-water test; a hardness of 132 in the

July test and 200 in the August test. The hardness normalization was done using the following formula as described in EPA's streamlined WER guidance (page 13);

LC_{50} at standard hardness =

$LC_{50 \text{ at sample hardness}}$ x(standard hardness /sample hardness) $^{0.9422}$

The consultant's report (on page 13 of 13) presented the findings in Table 4 by normalizing the SMAV values to the hardness of site-water tests (132 for the July test and 200 for the August date). WERs were calculated by dividing the site-water LC_{50} values by the SMAV (normalized to the hardness of the site water test); resulting in a WER of 8.042 for the first study in July and a WER of 6.029 for the second study in August.

Correction to original report results in slightly different final WER:
I double checked all these data and I have made one small correction to these calculations. In the July study data, the SMAV value was reported as being 32.22 after being normalized to the hardness value of 132. My calculations indicate that when the SMAV of 24.00 at a hardness of 100 is normalized to a hardness of 132, the normalized value is 31.18 instead of 32.22 as shown in Table 4. Using this to calculate the WER we get:

$$\text{WER} = \frac{LC_{50} \text{ value of site-water test}}{\text{SMAV normalized to hardness of the site-water test}}$$

$$= \frac{259.1 \text{ µg/L (site-water } LC_{50} \text{ value at hardness 132)}}{31.18 \text{ µg/L (SMAV normalized to a hardness of 132)}} = \mathbf{8.310 \text{ WER}}$$

Thus the WER values are 8.310 (July test) and 6.029 (August test).

The geometric mean of these two values is the **Final WER = 7.078**.

This WER of 7.078 can be used to adjust the Virginia copper criteria for purposes of assessing the need for total recoverable copper permit limits for the Sperryville, Virginia waste water treatment plant as it discharges into the Thornton River. This WER is unitless and is multiplied by Virginia copper criteria to adjust the criteria to account for the local water characteristics at the site of this permitted discharge.

The consultant's report, on page 10 and 13 makes reference to a "maximum allowable WER of 5.0". This is apparently a reference to guidance originally included in the 1994 Interim Guidance on Determination and Use of Water-Effect Ratios for Metals. EPA-823-B-94-001, where on page 61 there is some guidance on issues to investigate if the WER is larger than 5. This is not a prohibition on the use of WERs greater than 5; it is just guidance that when a WER is greater than 5, then there are some issues to be

investigated. This guidance for additional investigation is not included in the 2001 Streamlined Water-Effect Ratio Procedure for Discharges of Copper, which is the basis for the current study for Sperryville and the issues raised by the 1994 guidance have been addressed by the 2001 guidance, as discussed below.

The issues raised in the 1994 Interim Guidance are based on whether the metal is likely to be affected by elevated levels of suspended solids and/or organic carbon (if so, and the site water contained these, then this can explain the elevated WER). It is well known that the toxicity of copper is significantly affected by suspended solids and/or organic carbon and site water with elevated levels of these components can be expected to have elevated WERs, so this is not an unexpected situation with copper in streams that are dominated by sewage discharges. This is one of the reasons for EPA developing the streamlined WER procedure specifically for copper, to allow for a streamlined, less intensive WER study process because of the basic understanding of how natural waters can affect the toxicity of copper. The 2001 streamlined procedure for copper-WER takes this into account and is based on this basic understanding of copper toxicity.

Another issue raised in the 1994 guidance involved concerns the potential for lab-water LC_{50} values that may be lower than previously reported values or below the SMAV used in the derivation of the criteria. This situation could artificially increase the WER and make it less comparable to the criteria equations which are based on LC_{50} values that support the SMAV. This issue is also addressed in the 2001 streamlined copper-WER procedure which includes the stipulation that in such a case, the SMAV (normalized to the appropriate hardness) be used in calculating the WER. This approached was used in the Sperryville WER study.

Since these issues are addressed by the streamlined copper-WER procedure, and for copper, and this 2001 WER guidance specifically designed for copper supersedes the 1994 interim guidance for WERs for metals in general, these concerns have essentially been addressed by the later 2001 streamlined copper-WER guidance and are no longer of concern if the 2001 streamlined copper WER procedure is used. The streamlined copper WER guidance does not set a maximum allowable WER for copper and I have no reason to not follow this guidance. I therefore recommend that the correctly calculated final WER of 7.078 be used in permit decisions regarding this discharge. This is in keeping with other WERs established in STP-effluent-dominated streams where WERs have ranged from 2.593 to 15.7.

The original LC_{50} values from the two tests from July and August 2010, as well as the SMAV values after being normalized to the hardness level corresponding to the site-water toxicity test and the resulting WERs are shown in Table 1 attached below.

Final WER:
The final WER to be used with this permit with total copper measurements is the geometric mean of the two WER values 6.029 and 8.310 = **7.078**

The WER can be used with any hardness that is considered appropriate for the Sperryville effluent and Thornton River, without any need for any adjustments. Once a WER is calculated based on a site-water LC_{50} value and SMAV concentration normalized to equal hardness levels, the WER value is the same regardless of the hardness used in calculating a criterion value. It is simply a unitless adjustment factor in the criterion equation.

DEQ Review and Approval of WER by DEQ:
The Virginia Department of Environmental Quality's Water Quality Standards Unit has reviewed this study and approves the use of a total copper WER of 7.078 to adjust the copper criteria as it applies to the Town of Sperryville's STP permit and receiving stream Thornton River. This total copper WER will be used to adjust the copper criteria and calculate the resulting waste load allocations (WLA) for this permit and will be used to make permit decisions for the need for copper discharge limits for the Sperryville STP operated by the Rappahannock Water and Sewer Authority.

WER public participation and application in permits procedure:
The Virginia water Quality Standards (WQS) allow for a permittee to demonstrate that a WER is appropriate for their discharge and receiving stream. The WQS Regulation at 9VAC 25-260-140.F.4 states that the WER shall be subject to the public participation requirements of the Permit Regulation and described in the public notice of the permit proceedings. DEQ action to approve or disapprove a WER applicable to a permittee is a case decision rather than an amendment to the WQS. Decisions regarding WERs are subject to the public participation requirements of the Permit Regulation. The U.S. Environmental Protection Agency (EPA) normally technically views a WER as a site-specific criterion. However, because Virginia has incorporated the allowance for a WER in the Water Quality Standards regulation as part of the formula for the copper criteria, and because EPA has approved this form of the criteria, EPA does not have to (and will not) officially approve each individual WER, but they require that that the public be given the opportunity to comment on the use of the WER in a permit.

As long as the WER is the established following EPA and DEQ recommended protocols (as is the case for the Sperryville WWTP) and the study has been reviewed and approved by DEQ, the WER can be considered scientifically valid and can be used to apply the Virginia criteria for copper in an individual permit. DEQ will supply copies of the WER study and the review materials to EPA as a courtesy to keep them informed, but EPA does not have a need to officially approve individual WERs.

To satisfy the public participation requirements and give the public the opportunity to comment on the WER, the WER-modified copper criteria can be subjected to public participations via a permit related comment period, either via a permit re-issuance or permit modification.

Table 1;
Summary of all LC_{50} values from the Town of Sperryville STP WER studies; showing lab water values and SMAVs normalized to a standard hardness of that in the site-water test.

Test Description		**LC50 (total copper)**		**LC50 (total copper) (Normalized to hardness of site water)**
July 2010; Lab water (hardness 132mg/L)		28.53 µg/L		28.53 µg/L
July 2010; (hardness 132mg/L) **simulated stream water test**		259.1 µg/L		**259.1 µg/L**
***Ceriodaphnia. dubia* SMAV at hardness 100 = 24 µg/L: (see EPA Cu-WER Guidance, page 17)**			**Total Cu *C. dubia* SMAV (Normalized to hardness 132 mg/L)**	**31.18 µg/L**
August 2010; Lab water (hardness = 198)		23.12 µg/L		23.34 µg/L
August 2010; (hardness = 200) **simulated stream water test**		278 µg/L		**278 µg/L**
Species Mean Acute Value (SMAV) (see EPA Cu-WER Guidance, page 17)				
***Ceriodaphnia. dubia* SMAV at hardness 100 = 24 µg/L : (see EPA Cu-WER Guidance, page 17)**		24 µg/L	**Total Cu *C. dubia* SMAV (Normalized to hardness 200 mg/L)**	**46.11 µg/L**
WERs:		**Total Cu WER**		
July 2010 WER (using SMAV normalized to hardness @ 132 mg/L)	**259.1 µg/L / 31.18 µg/L**	**= 8.310**		
August 2010 WER (using SMAV normalized to hardness @ 200 mg/L)	**278 µg/L / 46.11 µg/L**	**= 6.029**		
		Final WER (total copper)		
Final WER (geometric mean of July and August WERs)		**7.078**		

Analysis of the Sperryville Jan-May effluent data for Ammonia as N
Averaging period for standard = 30 days

The statistics for Ammonia as N are:

Number of values	= 1
Quantification level	= .2
Number < quantification	= 0
Expected value	= 10
Variance	= 36.00001
C.V.	= .6
97th percentile	= 24.33418
Statistics used	= Reasonable potential assumptions - Type 2 data

The WLAs for Ammonia as N are:

Acute WLA	= 131.2
Chronic WLA	= 36.7
Human Health WLA	= ----

NO LIMIT IS REQUIRED FOR Ammonia as N

The Data are
10

Analysis of the Sperryville June-Dec effluent data for Ammonia as N
Averaging period for standard = 30 days

The statistics for Ammonia as N are:

Number of values	= 1
Quantification level	= .2
Number < quantification	= 0
Expected value	= 10
Variance	= 36.00001
C.V.	= .6
97th percentile	= 24.33418
Statistics used	= Reasonable potential assumptions - Type 2 data

The WLAs for Ammonia as N are:

Acute WLA	= 12.42
Chronic WLA	= 3.71
Human Health WLA	= ----

Limits are based on chronic toxicity and 4 samples/month, 1 samples/week

Maximum daily limit = 7.485557
✓Average weekly limit = 7.485556 = 7.5mg/l
✓Average monthly limit = 5.118067 = 5.1mg/l

Note: ✓The maximum daily limit applies to industrial dischargers N/A
✓The average weekly limit applies to POTWs
✓The average monthly limit applies to both.

The Data are
10

FACILITY: Sperryville
VPDES #: 62880

Ammonia Calculation - Acute Ammonia Criteria for Freshwater

	Temperature	pH	
DATA ENTRY:->	17.5	7.80	TIER INFORMATION: Jan-May

FT
FT=10^((.03)(20-T) = 1.1885022

FPH
FPH=1 if 8.0<=pH<=9.0 = NA
FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.1184857
FPH= 1.1184857

Acute Criteria Concentration=.52/FT/FPH/2 = 0.1955883

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Acute Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) Fraction= 0.0204179
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C,) pKa = 9.4810297
Total Acute Ammonia Criteria = Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Acute Ammonia Criteria = 0.1955883 / 0.02041790437 = Total Ammonia = 9.5792550 mg/l

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL ACUTE N-NH3 9.5792550 X .824 7.8933061 MG/L = (7.89)

Ammonia Calculation - Chronic Ammonia Criteria for Freshwater

	Temperature	pH	
DATA ENTRY:->	17.5	7.80	TIER INFORMATION: Jan-May

FT
FT=10^((.03)(20-T) = 1.1885022

FPH
FPH=1 if 8.0<=pH<=9.0 = NA
FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.1184857
FPH= 1.1184857

Ratio
Ratio = 13.5 if 7.7<=pH<=9.0 = 13.5
Ratio = 20.25 x (10^(7.7-pH))/(1+(10^(7.4-pH)) if 6.5<=pH<7.7 = NA
Ratio = 13.5

Chronic Criteria Concentration=.8/FT/FPH/RATIO = 0.0445785

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Chronic Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) Fraction= 0.0204179
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C) pKa = 9.4810297
Total Chronic Ammonia Criteria=Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Chronic Ammonia Criteria = 0.0445785 / 0.0204179 = Total Ammonia = 2.183305973 mg/l

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL CHRONIC N-NH3 2.1833060 X .824 1.7990441 MG/L = (1.80)

Revised 12/03/97: (i:wdbr1\common\permits\model\newamm)

Attachment 6b

FACILITY: Sperryville
VPDES #: 62880

Ammonia Calculation - Acute Ammonia Criteria for Freshwater

DATA ENTRY:->	Temperature	pH	TIER INFORMATION:
	25	7.60	Jun-Dec

FT
FT=10^((.03)(20-T) = 0.7079458

FPH
FPH=1 if 8.0<=pH<=9.0 = NA
FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.3047659
FPH= 1.3047659

Acute Criteria Concentration=.52/FT/FPH/2 = 0.2814756

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Acute Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) Fraction= 0.0221529
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C,) pKa = 9.2448413
Total Acute Ammonia Criteria = Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Acute Ammonia Criteria = 0.2814756 / 0.02215285331 = Total Ammonia = 12.7060654 mg/l

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL ACUTE N-NH3 12.7060654 X .824 10.4697979 MG/L = (10.47)

Ammonia Calculation - Chronic Ammonia Criteria for Freshwater

DATA ENTRY:->	Temperature	pH	TIER INFORMATION:
	25	7.60	Jun-Dec

FT
FT=10^((.03)(20-T) = 0.7079458

FPH
FPH=1 if 8.0<=pH<=9.0 = NA
FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.3047659
FPH= 1.3047659

Ratio
Ratio = 13.5 if 7.7<=pH<=9.0 = NA
Ratio = 20.25 x (10^(7.7-pH))/(1+(10^(7.4-pH)) if 6.5<=pH<7.7 = 15.6308439
Ratio = 15.630844

Chronic Criteria Concentration=.8/FT/FPH/RATIO = 0.0554083

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Chronic Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) Fraction= 0.0221529
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C) pKa = 9.2448413
Total Chronic Ammonia Criteria=Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Chronic Ammonia Criteria = 0.0554083 / 0.0221529 = Total Ammonia = 2.501182035 mg/l

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL CHRONIC N-NH3 2.5011820 X .824 2.0609740 MG/L = (2.06)

Revised 12/03/97: (i:wdbr1\common\permits\model\newamm)

4/18/2011 7:42:10 AM

Facility = Sperryville STP
Chemical = Ammonia as N (June-Nov)
Chronic averaging period = 30
WLAa = 14
WLAc = 4.1
Q.L. = .2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 8.27244738300687
Average Weekly limit = 8.27244738300688
Average Monthly LImit = 5.65608505848942

The data are:

9

4/18/2011 7:42:47 AM

Facility = Sperryville STP
Chemical = Ammonia as N (Dec-May)
Chronic averaging period = 30
WLAa = 230
WLAc = 100
Q.L. = .2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9

6/3/2011 8:20:33 AM

Facility = Sperryville WWTP
Chemical = Total Recoverable Copper
Chronic averaging period = 4
WLAa = 156
WLAc = 99
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 11
Expected Value = 29.9089
Variance = 180.588
C.V. = 0.449308
97th percentile daily values = 61.1189
97th percentile 4 day average = 44.2972
97th percentile 30 day average= 34.5239
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

19
15.45
16.9
31
19.7
34
18
34
36
29
41

MEMORANDUM

2111 North Hamilton Street

State Water Control Board
P. O. Box 11143

Richmond, VA.

SUBJECT: Rappahannock County
Sperryville SAA

TO: FILE

FROM: Mary Schwenn

DATE: August 1, 1975

COPIES:

Quads used: Washington
Thornton Gap
Woodville
Old Rag Mt.

Critical Flow: .012 cfs/sq. mi. (Thornton River near Laurel Mills)

The proposed point of discharge is located just below the confluence of the Thornton River and the North Fork Thornton River. The river has a rocky bottom and a swift flow, which is frequently broken by riffles.

D.A. above point of discharge = 28 sq. mi.

Flow = $\frac{.012 \times 28}{1.55}$

= .2167 MGD 0.092 mgd

D.A. between P.O.D. and Beaverdam Creek = .7 sq. mi.

stretch flow = $\frac{.012 \times .7}{1.55}$

= .0054 MGD

D.A. of Beaverdam Creek Watershed = 4.3 sq. mi.

Flow = $\frac{.012 \times 4.3}{1.55}$

= .0332 MGD

D.A. between Beaverdam Creek and White Walnut Run = 2.6 sq. mi.

stretch flow = $\frac{.012 \times 2.6}{1.55}$

= .0201 MGD

Attachment 7

D.A. of White Walnut Run Watershed = 7.2 sq. mi.

$$\text{Flow} = \frac{.012 \times 7.2}{1.55}$$

$$= .0557 \text{ MGD}$$

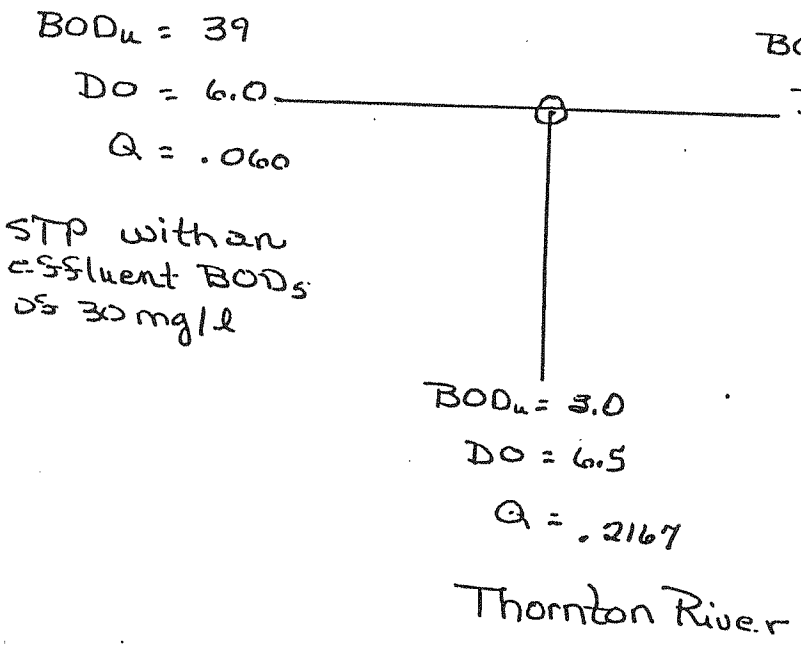
D.A. between White Walnut Run and the Covington River = 3.4 sq. mi.

$$\text{stretch flow} = \frac{.012 \times 3.4}{1.55}$$

$$= .0263 \text{ MGD}$$

/yre

Sperryville - Rappahannock Co.
VPDES - 5AA



Critical point occurs at the mixing point.

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Rappahannock County, Virginia and to seek comment on a proposed Water Effect Ratio (WER) study for that same water body.

PUBLIC COMMENT PERIOD: XXX, 2012 to 5:00 p.m. on XXX, 2012

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Rappahannock Water & Sewer Authority
P.O. Box 253, Sperryville, VA 22740

NAME AND ADDRESS OF FACILITY: Sperryville STP, 3751 Sperryville Pike, Sperryville, VA 22740

PROJECT DESCRIPTION: Rappahannock Water & Sewer Authority has applied for a reissuance of a permit for the public Sperryville STP. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 0.055 million gallons per day into a water body. The sludge will be disposed by hauling the sludge to the Remington WWTP for further treatment. The facility proposes to release the treated sewage water in the Thornton River in Rappahannock County in the Rappahannock watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: BOD, TSS, E. coli, Dissolved Oxygen, Ammonia as N, and pH.

WATER EFFECT RATIO STUDY: The Rappahannock Water & Sewer Authority conducted a study to develop a site-specific WER for the purpose of applying the copper water quality criteria, as defined in 9 VAC25-260-140(B). The study concluded that the final WER for copper at the specified location is 7.078, which result in acute and chronic copper criteria of 156 ug/L and 99 ug/L respectively, for the Sperryville STP VPDES permit.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.
Name: Alison Thompson
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3834 E-mail: alison.thompson@deq.virginia.gov Fax: (703) 583-3821

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3801
www.deq.virginia.gov

L. Preston Bryant, Jr
Secretary of Natural Resources

David K. Paylor
Director

STATE WATER CONTROL BOARD
ENFORCEMENT ACTION
SPECIAL ORDER BY CONSENT
ISSUED TO
THE RAPPAHANNOCK COUNTY WATER AND SEWER AUTHORITY
FOR
THE SPERRYVILLE SEWAGE TREATMENT PLANT
(VPDES PERMIT NO. VA0062880)

SECTION A: Purpose

This is a Consent Special Order issued under the authority of Va. Code §§ 62.1-44.15(8a) between the State Water Control Board and the Rappahannock County Water and Sewer Authority, regarding the Sperryville Sewage Treatment Plant, for the purpose of resolving certain violations of the State Water Control Law and the applicable permit and regulation.

SECTION B: Definitions

Unless the context clearly indicates otherwise, the following words and terms have the meaning assigned to them below:

1. "Administrative Process Act" or "APA" means Chapter 40 (§ 2.2-4000 *et seq.*) of Title 2.2 of the Va. Code.

2. "Authority" means Rappahannock County Water and Sewer Authority.

3. "Board" means the State Water Control Board, a permanent citizens' board of the Commonwealth of Virginia, as described in Va. Code §§ 10.1-1184 and 62.1-44.7.

4. "Department" or "DEQ" means the Department of Environmental Quality, an agency of the Commonwealth of Virginia as described in Va. Code § 10.1-1183.

5. "Director" means the Director of the Department of Environmental Quality, as described in Va. Code § 10.1-1185.

6. "Notice of Violation" or "NOV" means a type of Notice of Alleged Violation under Va. Code § 62.1-44.15.

7. "NRO" means the Northern Regional Office of DEQ, located in Woodbridge, Virginia.

8. "Order" means this document, also known as a "Special Order by Consent" or a "Consent Special Order."

9. "Permit" means VPDES Permit No. VA0062880, which was issued by authority of the Board to the Rappahannock County Water and Sewer Authority on August 31, 2006, and which expires on August 30, 2011.

10. "Regulation" means the VPDES Permit Regulation at 9 VAC 25-31-10 *et seq.*

11. "Sperryville" or "Town" means the Town of Sperryville.

12. "STP" means the Sperryville Sewage Treatment Plant, with a design flow of 0.055 MGD, located at 3751 Sperryville Pike, Sperryville in Rappahannock County, Virginia, which treats and discharges sewage for the Town of Sperryville.

11. "State Water Control Law" means Chapter 3.1(§ 62.1-44.2 *et seq.*) of Title 62.1 of the Va. Code.

12. "Va. Code" means the Code of Virginia (1950), as amended.

13. "VAC" means the Virginia Administrative Code.

14. "VPDES" means Virginia Pollutant Discharge Elimination System.

15. "Warning Letter" or "WL" means a type of Notice of Alleged Violation under Va. Code § 62.1-44.15.

SECTION C: Findings of Fact and Conclusions of Law

1. The Authority owns and operates the STP.

2. The STP is the subject of the Permit, which authorizes the Authority to discharge via Outfall 001 to the Thorton River which is located in the Rappahannock River Basin, in strict compliance with the terms and conditions of the Permit.

3. The Authority has experienced violations of Permit Condition Part I A(1) effluent limits for Ammonia as N and for Total Recoverable Copper. In response to these violations, DEQ sent the Authority the following NOVs and WLs:

    a. WL No. W2008-04-N-1001, dated April 8, 2008, (for the February 2008 monitoring period), citing Permit limit violations for exceeding the weekly

maximum and monthly average Permit limits for concentration for Total Recoverable Copper.

b. WL No. W2008-07-N-1002, dated July 9, 2008, (for the May 2008 monitoring period), citing Permit limit violations for exceeding the weekly maximum and monthly average Permit limits for concentration for Total Recoverable Copper.

c. WL No. W2008-10-N-1004, dated October 9, 2008, (for the August 2008 monitoring period), citing Permit limit violations for exceeding the weekly maximum and monthly average Permit limits for concentration for Total Recoverable Copper.

d. NOV No. W2009-01-N-0002, dated January 9, 2009, (for the November 2008 monitoring period), citing Permit limit violations for exceeding the weekly maximum and monthly average Permit limits for concentration for Ammonia as N in the outfall and for exceeding weekly maximum and monthly average Permit limits for concentration for Total Recoverable Copper.

e. NOV No. W2009-04-N-0002, dated April 8, 2009, (for the December 2008 to February 2009 monitoring periods), citing a Permit violation for failure to report the Total Recoverable Copper analysis.

4. On January 26, 2009, Environmental Systems Service, Ltd (ESS) on behalf of the Authority sent a NOV response letter to DEQ. ESS explained that the Ammonia as N violations were due to leaves that fell into the STP and had accumulated in the clarifier and causing a blockage of the activated sludge return to the clarifier. The leaves were cleaned out and ESS proposed that netting over the units be used to avoid further blockage concerns. ESS also explained that the Total Recoverable Copper violations were due to the fact the STP was not designed to, nor was able to remove metals of any type. Additionally, ESS proposed studying other treatment techniques including the use of chemical precipitation additives to reduce the Copper levels of the STP discharge.

5. On February 3, 2009, Authority staff and Don Hearl of ESS, the Authority's consultant, met with DEQ staff to discuss the January 9, 2009, NOV and potential methods to ensure future compliance with permitted limits. These measures have been incorporated into Appendix A of this order. The Total Recoverable Copper analysis has been submitted and the reporting issues have been resolved.

6. Va. Code § 62.1-44.5 states that: "[E]xcept in compliance with a certificate issued by the Board, it shall be unlawful for any person to discharge into state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances."

7. The Regulation, at 9 VAC 25-31-50, also states that except in compliance with a VPDES permit, or another permit issued by the Board, it is unlawful to discharge into state waters sewage, industrial wastes or other wastes.

8. Va. Code § 62.1-44.15(5a) states that a VPDES permit is a "certificate" under the statute.

9. The Department has issued no permits or certificates to the Authority for the Town of Sperryville other than VPDES Permit No. VA0062880.

10. The Thornton River is a surface water located wholly within the Commonwealth and is a "state water" under State Water Control Law.

11. As detailed in the findings of fact above, DEQ concludes that the Authority has violated condition Part I A(1) of the Permit, Va. Code § 62.1-44.5 and 9 VAC 25-31.50.A.

SECTION D: Agreement and Order

Accordingly, the Board, by virtue of the authority granted it in Va. Code § 62.1-44.15 8(a) the Board orders the Rappahannock County Water and Sewer Authority and the Rappahannock County Water and Sewer Authority agrees, to perform the actions described in Appendices A and B of this Order.

SECTION E: Administrative Provisions

1. The Board may modify, rewrite, or amend this Order with the consent of the Rappahannock County Water and Sewer Authority for good cause shown by the Rappahannock County Water and Sewer Authority, or on its own motion pursuant to the Administrative Process Act after notice and opportunity to be heard.

2. This Order addresses and resolves only those violations specifically identified in Section C of this Order. This Order shall not preclude the Board or the Director from taking any action authorized by law, including but not limited to: (1) taking any action authorized by law regarding any additional, subsequent, or subsequently discovered violations; (2) seeking subsequent remediation of the STP; or (3) taking subsequent action to enforce the Order.

3. For purposes of this Order and subsequent actions with respect to this Order only, the Rappahannock County Water and Sewer Authority admits the jurisdictional allegations, findings of fact, and conclusions of law contained herein.

4. The Rappahannock County Water and Sewer Authority consents to venue in the Circuit Court of the City of Richmond for any civil action taken to enforce the terms of this Order.

5. The Rappahannock County Water and Sewer Authority declares it has received fair and due process under the Administrative Process Act and the Virginia Water Pollution Control Law and it waives the right to any hearing or other administrative proceeding authorized or required by law or regulation, and to any

judicial review of any issue of fact or law contained herein. Nothing herein shall be construed as a waiver of the right to any administrative proceeding for, or to judicial review of, any action taken by the Board to modify, rewrite, amend, or enforce this Order.

6. Failure by the Rappahannock County Water and Sewer Authority to comply with any of the terms of this Order shall constitute a violation of an order of the Board. Nothing herein shall waive the initiation of appropriate enforcement actions or the issuance of additional orders as appropriate by the Board or the Director as a result of such violations. Nothing herein shall affect appropriate enforcement actions by any other federal, state, or local regulatory authority.

7. If any provision of this Order is found to be unenforceable for any reason, the remainder of the Order shall remain in full force and effect.

8. The Rappahannock County Water and Sewer Authority shall be responsible for failure to comply with any of the terms and conditions of this Order unless compliance is made impossible by earthquake, flood, other acts of God, war, strike, or such other occurrence. The Rappahannock County Water and Sewer Authority shall show that such circumstances were beyond its control and not due to a lack of good faith or diligence on its part. The Rappahannock County Water and Sewer Authority shall notify the DEQ Regional Director verbally within 24 hours and in writing within three business days when circumstances are anticipated to occur, are occurring, or have occurred that may delay compliance or cause noncompliance with any requirement of the Order. Such notice shall set forth:

    a. the reasons for the delay or noncompliance;

    b. the projected duration of any such delay or noncompliance;

    c. the measures taken and to be taken to prevent or minimize such delay or noncompliance; and

    d. the timetable by which such measures will be implemented and the date full compliance will be achieved.

    Failure to so notify the Regional Director verbally within 24 hours and in writing within three business days, of learning of any condition above, which the Rappahannock County Water and Sewer Authority intends to assert will result in the impossibility of compliance, shall constitute a waiver of any claim to inability to comply with a requirement of this Order.

9. This Order is binding on the parties hereto, their successors in interest, designees and assigns, jointly and severally.

10. This Order shall become effective upon execution by both the Director or his designee and the Rappahannock County Water and Sewer Authority.

Nevertheless, the Rappahannock County Water and Sewer Authority agree to be bound by any compliance date which precedes the effective date of this Order.

11. This Order shall continue in effect until:

a. the Rappahannock County Water and Sewer Authority petitions the Director or his designee to terminate the Order after it has completed all of the requirements of the Order and the Director or his designee approves the termination of the Order; or

b. the Director or Board terminates the Order in his or its sole discretion upon 30 days' written notice to the Rappahannock County Water and Sewer Authority.

Termination of this Order, or any obligation imposed in this Order, shall not operate to relieve the Rappahannock County Water and Sewer Authority from its obligation to comply with any statute, regulation, permit condition, other order, certificate, certification, standard, or requirement otherwise applicable.

12. Any plans, reports, schedules or specifications attached hereto or submitted by the Rappahannock County Water and Sewer Authority and approved by the Department pursuant to this Order are incorporated into this Order. Any non-compliance with such approved documents shall be considered a violation of this Order.

13. The undersigned representative of the Rappahannock County Water and Sewer Authority certifies that he or she is a responsible official authorized to enter into the terms and conditions of this Order and to execute and legally bind the Rappahannock County Water and Sewer Authority to this document. Any documents to be submitted pursuant to this Order shall also be submitted by a responsible official of the Rappahannock County Water and Sewer Authority.

14. This Order constitutes the entire agreement and understanding of the parties concerning settlement of the violations identified in Section C of this Order, and there are no representations, warranties, covenants, terms or conditions agreed upon between the parties other than those expressed in this Order.

15. By its signature below, the Rappahannock County Water and Sewer Authority voluntarily agrees to the issuance of this Order.

And it is so ORDERED this 27th day of October, 2009.

Thomas A. Faha, NRO Regional Director
Department of Environmental Quality

The Rappahannock County Water and Sewer Authority voluntarily agree to the issuance of this Order.

By: Eugene Legget D, Jr., Chairman

Date: 22 July 09

Commonwealth of Virginia
City/County of Rappahannock

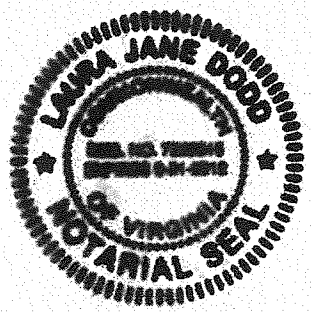
The foregoing document was signed and acknowledged before me this 22 day of July, 2009, by Eugene Legget, who is Chairman (title) of the Rappahannock County Water and Sewer Authority on behalf of the Authority.

Laura Jane Dodd
Notary Public

7209615
Registration No.

My commission expires: 08-31-2012

Notary seal:



APPENDIX A

The Rappahannock County Water and Sewer Authority shall:

1. Leaf netting will be purchased and available on site within 30 days of the execution of the order and will be installed prior to the beginning of fall leaf dropping. Netting shall remain in place on all open top tanks until leaf fall ends. Proof of installation of the netting shall be submitted to NRO within 15 days of completion of the work.

2. Within 60 days of the execution of this Order, submit a Water Effects Ratio (WER) Study Plan to the Central Office of DEQ for review and approval. (Submit the original to Central Office and one copy of the Plan to NRO).

3. Within 180 days of DEQ approval of the WER Study Plan complete a WER Study.

4. Within 30 days of the date of completion of the WER study submit the results to the Central Office of DEQ for review and approval. (Submit one copy of the Plan to NRO).

5. Within 30 days of DEQ approval of the WER Study results, after the EPA review and public notice request a formal modification of the VPDES Permit to include the revised Total Recoverable Copper limits from NRO.

6. If the WER Study is not approved, submit to NRO within 30 days of the rejection of the WER Study, an alternative schedule and plan to comply with the conditions of the Permit, for review and approval.

7. Begin implementation of the plan and schedule referenced in paragraph 6 above, within 30 days of approval.

8. Operate the STP in a workman-like manner in order to produce the best quality effluent of which the STP is capable during implementation of this schedule.

Correspondence required by this Order, shall be submitted to:

Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, VA 22193
Or
Department of Environmental Quality
Central Office
Attn: Alex Barron
629 East Main Street
Richmond, VA 23219

APPENDIX B
INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

From the effective date of this Order until completion of the corrective action requirements contained in Appendix A, the Authority shall monitor and limit the discharge from Outfall No. 001 of the STP in accordance with VPDES Permit Number VA0062880, except as specified below. These interim limits shall retroactively apply, if applicable, as of the first day of the month in which this Order becomes effective.

These requirements shall be construed in light of the Regulations.

Parameter Description	Parameter Limits					Monitoring Requirements	
	Quantity Average	Quantity Maximum	Concentration Minimum	Concentration Average	Concentration Maximum	Sample Frequency	Sample Type
Total Recoverable Copper	NL	NL	N/A	N/A	N/A	1/3M	Grab

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Sperryville STP
NPDES Permit Number: VA0062880
Permit Writer Name: Alison L. Thompson
Date: June 14, 2011

Major [] **Minor** [X] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?		X	
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?			X
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?	X		
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water? Downstream impairments		X	
a. Has a TMDL been developed and approved by EPA for the impaired water? downstream	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?	X		
10. Does the permit authorize discharges of storm water?		X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?	X		

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?		X	
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?	X		
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Alison L. Thompson
Title	Water Permits Technical Reviewer
Signature	
Date	6/15/11